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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/065,848	11/25/2002	Evangelos Laskaris	040849-0194	9715

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EXAMINER

FETZNER, TIFFANY A

ART UNIT	PAPER NUMBER
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2859

DATE MAILED: 03/30/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Advisory Action  
Before the Filing of an Appeal Brief**

Application No.

10/065,848

Applicant(s)

LASKARIS ET AL.

Examiner

Tiffany A. Fetzner

Art Unit

2859

**--The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

THE REPLY FILED 18 March 2005 FAILS TO PLACE THIS APPLICATION IN CONDITION FOR ALLOWANCE.

1. ☒ The reply was filed after a final rejection, but prior to filing a Notice of Appeal. To avoid abandonment of this application, applicant must timely file one of the following replies: (1) an amendment, affidavit, or other evidence, which places the application in condition for allowance; (2) a Notice of Appeal (with appeal fee) in compliance with 37 CFR 41.31; or (3) a Request for Continued Examination (RCE) in compliance with 37 CFR 1.114. The reply must be filed within one of the following time periods:

- a) ☒ The period for reply expires 6 months from the mailing date of the final rejection.  
b) ☐ The period for reply expires on: (1) the mailing date of this Advisory Action, or (2) the date set forth in the final rejection, whichever is later. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of the final rejection.

Examiner Note: If box 1 is checked, check either box (a) or (b). ONLY CHECK BOX (b) WHEN THE FIRST REPLY WAS FILED WITHIN TWO MONTHS OF THE FINAL REJECTION. See MPEP 706.07(f).

Extensions of time may be obtained under 37 CFR 1.136(a). The date on which the petition under 37 CFR 1.136(a) and the appropriate extension fee have been filed is the date for purposes of determining the period of extension and the corresponding amount of the fee. The appropriate extension fee under 37 CFR 1.17(a) is calculated from: (1) the expiration date of the shortened statutory period for reply originally set in the final Office action; or (2) as set forth in (b) above, if checked. Any reply received by the Office later than three months after the mailing date of the final rejection, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**NOTICE OF APPEAL**

2. ☐ The reply was filed after the date of filing a Notice of Appeal, but prior to the date of filing an appeal brief. The Notice of Appeal was filed on \_\_\_\_\_. A brief in compliance with 37 CFR 41.37 must be filed within two months of the date of filing the Notice of Appeal (37 CFR 41.37(a)), or any extension thereof (37 CFR 41.37(e)), to avoid dismissal of the appeal. Since a Notice of Appeal has been filed, any reply must be filed within the time period set forth in 37 CFR 41.37(a).

**AMENDMENTS**

3. ☐ The proposed amendment(s) filed after a final rejection, but prior to the date of filing a brief, will not be entered because  
(a) ☐ They raise new issues that would require further consideration and/or search (see NOTE below);  
(b) ☐ They raise the issue of new matter (see NOTE below);  
(c) ☐ They are not deemed to place the application in better form for appeal by materially reducing or simplifying the issues for appeal; and/or  
(d) ☐ They present additional claims without canceling a corresponding number of finally rejected claims.

NOTE: \_\_\_\_\_. (See 37 CFR 1.116 and 41.33(a)).

4. ☐ The amendments are not in compliance with 37 CFR 1.121. See attached Notice of Non-Compliant Amendment (PTOL-324).  
5. ☐ Applicant's reply has overcome the following rejection(s): \_\_\_\_\_.  
6. ☐ Newly proposed or amended claim(s) \_\_\_\_\_ would be allowable if submitted in a separate, timely filed amendment canceling the non-allowable claim(s).  
7. ☒ For purposes of appeal, the proposed amendment(s): a) ☒ will not be entered, or b) ☐ will be entered and an explanation of how the new or amended claims would be rejected is provided below or appended.  
The status of the claim(s) is (or will be) as follows:  
Claim(s) allowed: \_\_\_\_\_.  
Claim(s) objected to: \_\_\_\_\_.  
Claim(s) rejected: 1-23.  
Claim(s) withdrawn from consideration: \_\_\_\_\_.

**AFFIDAVIT OR OTHER EVIDENCE**

8. ☐ The affidavit or other evidence filed after a final action, but before or on the date of filing a Notice of Appeal will not be entered because applicant failed to provide a showing of good and sufficient reasons why the affidavit or other evidence is necessary and was not earlier presented. See 37 CFR 1.116(e).  
9. ☐ The affidavit or other evidence filed after the date of filing a Notice of Appeal, but prior to the date of filing a brief, will not be entered because the affidavit or other evidence failed to overcome all rejections under appeal and/or appellant fails to provide a showing of good and sufficient reasons why it is necessary and was not earlier presented. See 37 CFR 41.33(d)(1).  
10. ☐ The affidavit or other evidence is entered. An explanation of the status of the claims after entry is below or attached.

**REQUEST FOR RECONSIDERATION/OTHER**

11. ☒ The request for reconsideration has been considered but does NOT place the application in condition for allowance because:  
See Continuation Sheet.  
12. ☐ Note the attached Information Disclosure Statement(s). (PTO/SB/08 or PTO-1449) Paper No(s). \_\_\_\_\_.  
13. ☐ Other: \_\_\_\_\_.

10/065848

Continuation of 11. does NOT place the application in condition for allowance because: The claims which are under final rejection, as written are met by the prior art of record, Chari et al., US patent no. 5,307,039 issued April 26th 1994; and Byrne et al., US patent 6,211,676 B1 meet the limitations of the claims which are actually recited. Applicant's arguments are not persuasive because applicant has mis-read the examiner's position in an attempt to assist applicant with the current unresolved issues and concerns that remain. The examiner states the following:

Applicant's claim 1 requires "an open Magnetic resonance imaging (MRI) device, [See Chari et al., col. 2 lines 1-4; Bryne et al., figures 1, 2, abstract, and col. 1 lines 3-7] Under the "comprising" applicant requires "a main coil for generating a magnetic field for an imaging volume". With respect to Chari et al., the main magnet is component 10 of figures 1 and 2. The claim then requires the feature of "shaping coils" which is definitionally unclear because any MR coil which shapes, shims, controls or helps to make the main static magnetic field more: homogeneous / uniform / consistent / constant throughout the imaging volume, by minimizing magnetic field fluctuations or induced eddy currents is effectively a magnetic field "shaping coil". According to applicant's claims the 'plurality of "shaping coils" are required to be "positioned radially inside said main coil". Chari et al., Figure 2 clearly shows that the plurality of coils 24 through 28 which according to Chari et al., col. 3 line 55 through col. 4 line 16 cause in a 0.5 Tesla magnetic field, a calculated magnetic field homogeneity of 26.8ppm for a 40 cm., imaging volume; and a homogeneous magnetic field of 5.2 ppm within a 30 cm. volume in one configuration; and in a second configuration the magnetic field has a homogeneity of 41pp for the 40cm volume, and a 7ppm homogeneity for the 30 cm. volume. The fact that the current flowing through the coils homogenizes (i.e. makes more uniform, controls, "shapes" the magnetic field to a specific ppm volume for imaging volume 29 of figures 2, 3, and 4 is evidence to the fact that the current in coils 24 through 28 effectively function to "shape" the magnetic field generated by magnet component 10. Additionally magnet component 10 is taught to "comprise" coils 24 through 28 therefore since components 24 through 28 are shown to be "within" (i.e. "inside") the magnet 10. coils 24 through 28 specifically as illustrated in figures 2, 3, and 4, meet the requirements of being "positioned radially inside said main coil". The examiner also notes that the locational positions of coils 24 through 28 which are shown in figures 2, 3, and 4 are shown as being within main magnet 10 and "axially further from said volume" (i.e. the shaped, homogenized magnetic field volume 29) "than said main coil or in a plane of said main coil". The teachings of col. 3 line 55 through col. 4 line 16 indicate that coils 24 through 28 effectively function "to shape the magnetic field in said volume". Therefore each and every limitation as verbatimly written is met by the Chari et al., reference.

Applicant argues in the March 18th 2005 after final arguments on page 7 the second to last paragraph and on page 8 the second paragraph, that coils 24 through 28 are actually the main magnet 10 and therefore are not separate shaping coils, because the main generating magnet and shaping coils are different structural elements, and that the examiner has mis-applied the prior art. The examiner is not persuaded by applicant's argument, because applicant's claim as currently written, fails to recite that the "plurality of shaping coils" are "separate" or not a part of or "distinct from" the main magnet. Additionally, the examiner notes that the examiner is not confusing the different functions of a main generating magnetic field coil, and a shaping coil. The Chari et al., reference teaches that the main magnet 10 "comprises" additional components (i.e. coils 24 through 28) which control current flow direction and homogenize the field to a specific ppm. The applicant's claim requires that the "shaping coils" be "positioned radially inside said main magnet coil" and the examiner reiterates that coils 24 through 28 are "positioned radially inside" the main coil generating magnet 10, as shown and taught by the reference. The word "comprising" means that the main magnet is "comprised" of more than one component.

If applicant is intending to argue that the plurality of shaping coils are located "outside of the main magnet" or are completely separate from the housing of the main magnet coil 10, the examiner notes that the feature is not an aspect of applicant's claims, and is in fact contradicted by the fact, that applicant's claim requires the "plurality of shaping coils" (i.e. the components which the examiner equates to coils 24 through 28) be "positioned radially inside said main coil and axially further from said volume than said main coil or in a plane of said main coil". The examiner notes that the words "positioned radially inside said main coil" (i.e. inside main magnet component 10) may be the source of confusion, but clearly coils 24, 25, 26, 27, and 28 of figures 2 through 4 are located within the main magnet component 10. Therefore the examiner has met the requirements of a prima facie case of anticipation as required by 35 USC 102 (b). Applicant fails to require the "shaping coils" to be different or auxiliary or external from the main magnet generating component 10. With respect to Bryne et al., the Bryne et al., reference shows and teaches a main coil (i.e. coil 1a is the main coil of the upper assembly, coil 2a is the coil of the lower assembly.) "for generating a magnetic field for an imaging volume". [see col. 3 lines 7-8] The examiner notes that component 3 is the imaging volume in figures 1 and 2 of Bryne et al., Additionally, figures 1 and 2 show a plurality of coils identified as component 5, which according to the Bryne et al., reference have two distinct functions. The coils 5 identified as toroidal shield coils 5 [See col. 2 line 39 through col. 3 line 6 of Bryne et al.] function to both "constrain and configure" (i.e. control and shape) the return magnetic flux which flows between magnetic poles 1 and 2, which may be connected in series so that the imaging magnetic field and the shielding magnetic field are generated by the same current. The coils 5 are offset from the center of the poles 1 and 2 because "some leakage flux from the return path into the imaging volume 3 which increases the magnetic field on the side nearest the return. By offsetting the locus of the loop" (i.e. the locus of the loop which links the centers of shielding coils 5) "with respect to the centers of the poles 1 and 2 this effect can be compensated, i.e. flux injected into the imaging volume 3 from ends of the return path is concentrated on the side furthest from the return." [See col. 3 lines 44-58 of Bryne et al.,] Because the coils 5 constrain (i.e. shield) and configure (i.e. shape) the main magnetic field, by both shielding magnetic flux from leaking, and configuring (i.e. shaping) the magnetic field of the imaging volume by injecting magnetic flux into the imaging volume. Coil component 5 serves both a shielding and a magnetic flux shaping function.

Applicant argues that Bryne et al., lacks a plurality of "shaping coils" and that shielding coils serve a different purpose than shaping coils. [See the after-final 03/18/2005 remarks concerning Bryne et al., page 8 last paragraph through page 9 paragraph 2]. However, the examiner disagrees with applicant's position that shaping coils are "clearly different" because a coil which shields magnetic flux via preventing magnetic flux from interacting with another spatial region, either causes the flux to cease by absorbing the magnetic flux, or by diverting the flux in a different direction, in either case the impinging magnetic flux is intrinsically effected and shaped by the presence of the shield coil, because the shield coil alters the magnetic flux from continuing unabated out to infinity. The examiner's position is that contrary to applicant's argument shielding and shaping magnetic coils are not mutually exclusive components. Evidence to support

the examiner's position is the teaching of Byrne et al., which states that the shielding coils "constrain and configure" (i.e. control and shape) [See Byrne et al., col. 2 lines 39-44] the main magnetic field, and the injection of magnetic flux back into the imaging volume, which further shapes imaging volume 3. The examiner notes that applicant has not provided a clear definition as to what applicant uses as the definitional line of each of the respective terms. "shaping", "shielding", "bucking", "shimming" is, and that applicant appears to be arguing that each term. "shaping", "shielding", "bucking", "shimming" is mutually exclusive to one of ordinary skill in the art. The examiner disagrees. the terminology is not mutually exclusive, the terms in fact overlap and in some situations may be functionally synonymous, especially since applicant's original disclosure is silent as to the scope and definition of each respective term.

A "shaping coil", is broadly interpreted by the examiner as being any coil in a magnetic resonance device or method which alters, or diverts the magnetic flux fields in a manner to produce a desirable normally homogeneous magnetic field. The examiner interprets the words "shielding coil" as broadly meaning any MR coil which is capable of controlling / blocking / diverting / reducing, or minimizing magnetic flux from extending beyond a certain location, such as outside of the area that makes-up the magnetic resonance apparatus, or outside of the MR suite. (i.e. shielding coils prevent magnetic flux from extending out to infinity, and usually protect an individual or component from, or reduce the amount of magnetic flux to which an individual or component is exposed.). A shielding coil may also shape magnetic flux because it interferes with and alters the otherwise infinitely extending magnetic field. The examiner interprets the term "bucking coil", as any coil which serves the functional purpose of compensating for and controlling stray magnetic fields, (i.e. induced eddy currents, magnetic fields which are extraneous to the components of the MR apparatus, and magnetic fields which are not eliminated by initial shielding. The examiner notes that because a "bucking coil" is designed to control, divert, block, and alter magnetic fields that a "bucking coil" may also be considered to be a type of functional "shaping coil" or a type of "shield coil" or even a type or auxiliary "shim coil". The examiner considers a "shimming coil" to be an additional, auxiliary or secondary coil which is not relied upon in the actual imaging process, (\*i.e. a shim coil is not a main coil, not an RF coil, and not a primary gradient coil), whereby the main magnetic fields of the MR apparatus are homogenized, and usually higher-order magnetic field fluctuations are reduced. A shim coil is a type of magnetic field shield because it reduces extraneous eddy currents, like a bucking coil, effectively shapes the magnetic fields produced by the MR apparatus, is a type of magnetic shield in various magnetic resonance prior art devices, and is used to expand the homogeneous region of the imaging volume. An exemplary metaphor for a "shim coil" is a type of magnetic field "fine adjustment", whereas "shaping coils" and "shielding coils" or "bucking coils" are usually taught with respect to "coarse" or initial, or primary magnetic field adjustment components.

Because the Byrne et al., coil components 5 function as both a "shielding" and "a shaping" coil as taught by the reference, the applicant's argument is not persuasive. Figures 1 and 2 also show that the coil components 5 are "positioned radially inside said main coil (i.e. components 1a, 2a) and axially further from said volume (i.e. component 3) than said main coil" (i.e. components 1a, 2a) "or in a plane of said main coil to shape said magnetic field in said volume. The examiner therefore is not persuaded by applicant's arguments for claim 1. The examiner also reiterates that applicant's claim fails to recite the presence of a shield coil in claim 1, or that the shielding coil is mutually exclusive from the plurality of shaping coils, with an applicant specific definition for applicant's definition of "shaping" coil and "shielding coil". The applied art meets the claim because structures which meet the functional requirements of the claims are taught, shown, and found within the Byrne et al., reference. With respect to applicant's arguments that Byrne et al., lacks shaping coils with respect to claim 17, on page 9 last paragraph through page 10 paragraph 1, of the March 18th 2005 response, and lacks shaping coils for claim 20. [See the march 18th 2005 after final response page 10 paragraph 2]. The fact that Byrne et al., teaches and shows shaping coils has already been addressed by the examiner. [See everything previous to this above.]

With respect to applicant's arguments concerning claim 23 on page 10 the last-to paragraphs of the March 18th 2004 response Byrne et al., shows at least two sets of shaping coils 5 because half of the plurality of coils 5 are located in the upper half of the open magnet structure and half of the plurality of coils 5 which do functionally serve to shape the main image volume 3 are located in the lower half of the open magnet structure. Therefore applicant's arguments are not persuasive and all of applicant's finally rejected independent claims coils fail to distinguish applicant's invention over the applied prior art.

The examiner attempted to explain the above to applicant's representative in the March 24th 2005 telephonic interview. No resolution resulted. in order for applicant to resolve some of the issues raised above. Applicant should A) clarify that shaping coils are not part of and are explicitly different from the main coil of component 1. The problem is apparently the words "shaping coils positioned radially inside said main coil" because these words imply that the shaping coils are an aspect of the main magnet coil component. B) applicant needs to clarify either in the specification or claims without adding new matter, concerning applicant's different definitions for the terms "shaping", "shielding", "bucking", "shimming" etc., since these terms by themselves, contrary to applicant's arguments are not mutually exclusive terms, and their respective overlap, and use in the art as functionally, situational synonyms, is creating confusion, as to what components constitute applicant's inventive structure. The examiner also notes that applicant is silent on the location of applicant's components with respect to the main components of a conventional MRI apparatus, (i.e. the excitation coils, gradient coils, etc.) are met or lacked by the prior art. C) The examiner suggests that applicant find a different way of expressing "positioned radially inside the main coil" if the shaping coils are meant to be entirely exclusive of the main generating magnetic field magnet coil. The examiner also notes that any amendment by applicant would be subject to a new prior art search based on however applicant corrects the claims by amendment, since clarifying the claims raises the issue of a change in scope to the pending finally rejected claims.

If applicant wishes to work with the examiner, to resolve the above issues and concerns. Applicant's representative is invited to contact the examiner, since the main problem is the actual wording and lack of clear definitions for the recited components within the specification and claims. The examiner, examines the claims with respect to the prior art, based upon what is actually recited within the claims. The examiner agrees that a main magnet and a shaping coil are different components, the problem is that the main magnet also comprises other components, which meet applicant's limitations and which are located in accordance with how the structural arrangement is specified in the finally rejected claims. Figure 1 of applicant's instant application is visually different from the magnet structures of the applied prior art references, but not when the teachings of the applied prior art are considered in view of what applicant actually recites in the finally rejected claims.

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